AN UNUSUAL SNOWSTORM IN TEXAS

By EDWIN J. FOSCUE

A few days before Christmas, 1929, Texas was visited by a snowstorm of unusual severity, which paralyzed traffic in the central portion of the State. The quantity of snow that fell at certain places was much higher than the average for a region that far south (26 inches at Hillsboro in central Texas), and this factor made the storm one of unusual interest. Texas has a north and south extension of about 800 miles. In the "Panhandle" region heavy snows are quite common every winter, while along the Gulf coast and in the lower Rio Grande Valley area snow is practically unknown, and even in central Texas snows are rare. In this storm northeast Texas had no snow; even the extreme northern part of the "Panhandle" was without snow or with only a trace, while central and south Texas had very heavy snows.

Because of the unusual distribution of the snowfall during this storm as reported by the newspapers of the

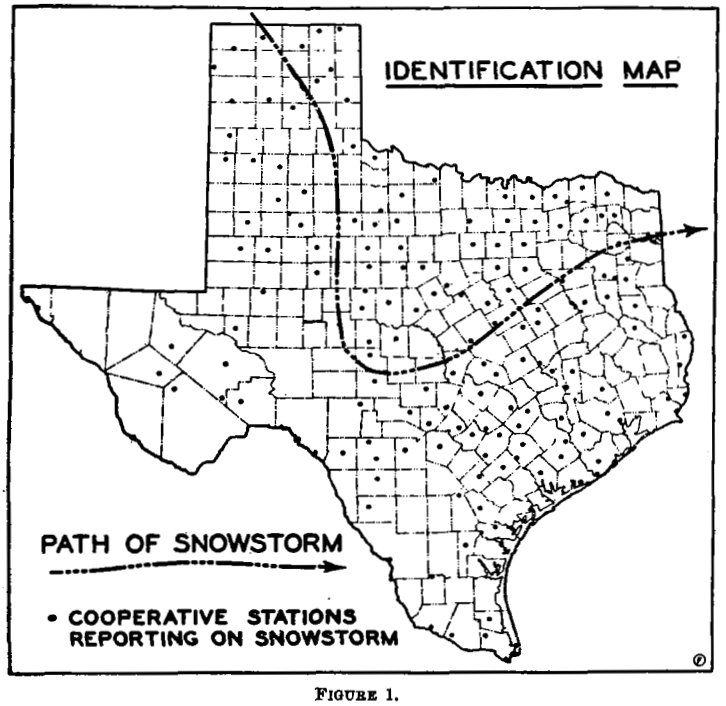

FIGURE 1.

State, the writer became interested in determining the true state of conditions which might bring about such a freakish storm. Questionnaires were mailed out to the cooperative weather observers of the State, some 240 in number, asking for (1) minimum temperature, (2) rainfall in inches, (3) snowfall in inches, and (4) wind directions, for each of the four days of the storm from December 19 to December 22, together with total snowfall for the four days. Out of the 240 questionnaires mailed out, 180 were returned, and 171 of these had complete enough data as to be of value. Minimum temperature and snowfall were reported on almost completely; rainfall and wind directions less accurately. The data obtained from these questionnaires are shown in Table 1. (For 5 or 6 representative stations in each of the 7 sections into which the State is divided by the climatological service at Houston, Tex.). The distribution of the stations is shown in Figure 1, together with the path of the center of the storm during its four-day trip across the State.

PRESSURE

Pressure conditions over the United States for the four days of December 18, 19, 20, and 21, as shown on Figure 2 (reproduced from Government weather maps published in Washington on those dates), show a definite mixing of low and high pressure phenomena over Texas, which caused the heavy precipitation in the form of snow. On December 18 the high-pressure area of Montana (31 inches in the center) had a pronounced southward extending tongue which reached below the Rio Grande. On that same date an intense low-pressure area (29.6 inches in the center) dominated the Gulf Coast States, bringing in large quantities of warm moist air from the Gulf of Mexico. This tongue of cold, dry air accompanying the HIGH slipped into west Texas from the north and then turned eastward, moving over to the Atlantic coast. On December 20 and 21 the HIGH occupied the place that was occupied by the LOW on the 18th. The moisture was already there, ready for a wind cool enough to cause condensation. The wind accompanying the HIGH was not only cool enough to cause condensation, but actually cool enough to cause the moisture to be frozen and to be precipitated in the form of snow. While heavy snows sometimes occur in the south, due to the mixing of cold air with the warm, moist air from the Gulf, from 4 to 8 inches is usually a very heavy fall for a 24-hour period.[1] Actual Government records for Hillsboro, Tex., report a 26-inch fall for a period of less than 48 hours.

TEMPERATURE

The isothermal maps of Texas for the four days of the storm (fig. 3) show a general progression of the subzero area along the line of the center of greatest snowfall for the western part of the State. On the 19th the subzero area was in the northwest part of the "Panhandle," with the isotherms of 10° and 20° extending far to the south. On the 20th the isothermal lines remained about the same. On the 21st two very cold centers developed in the central part of the State, with a minimum of 4° below zero at the resort town of Kerrville, southwest of Austin. The other cold area had its center west of Hillsboro, but there the temperatures did not reach the zero point. On the fourth day of the storm, December 22, temperature conditions were modified a bit, although extremely cold weather still prevailed in all parts of the State. The pressure by the 4th day was quite high, and cold, clear weather dominated all but the eastern part of the State. Subfreezing temperatures were recorded in every town of the lower Rio Grande Valley with the exception of Point Isabel. (See Table I for minimum temperatures.)

DAILY SNOWFALL

In order to plot the movement and progress of the storm, maps were made to show the region of snowfall at the end of a 24-hour period for each of the four days. These maps do not show the snow that had accumulated from the day before, but merely map those areas having snowfall during that 24-hour period. The first day, December 19 (fig. 4), showed snowfall only in the central "Panhandle" area, with a maximum fall of 4 inches

[1] Ward: The climates of the United States, page 250.

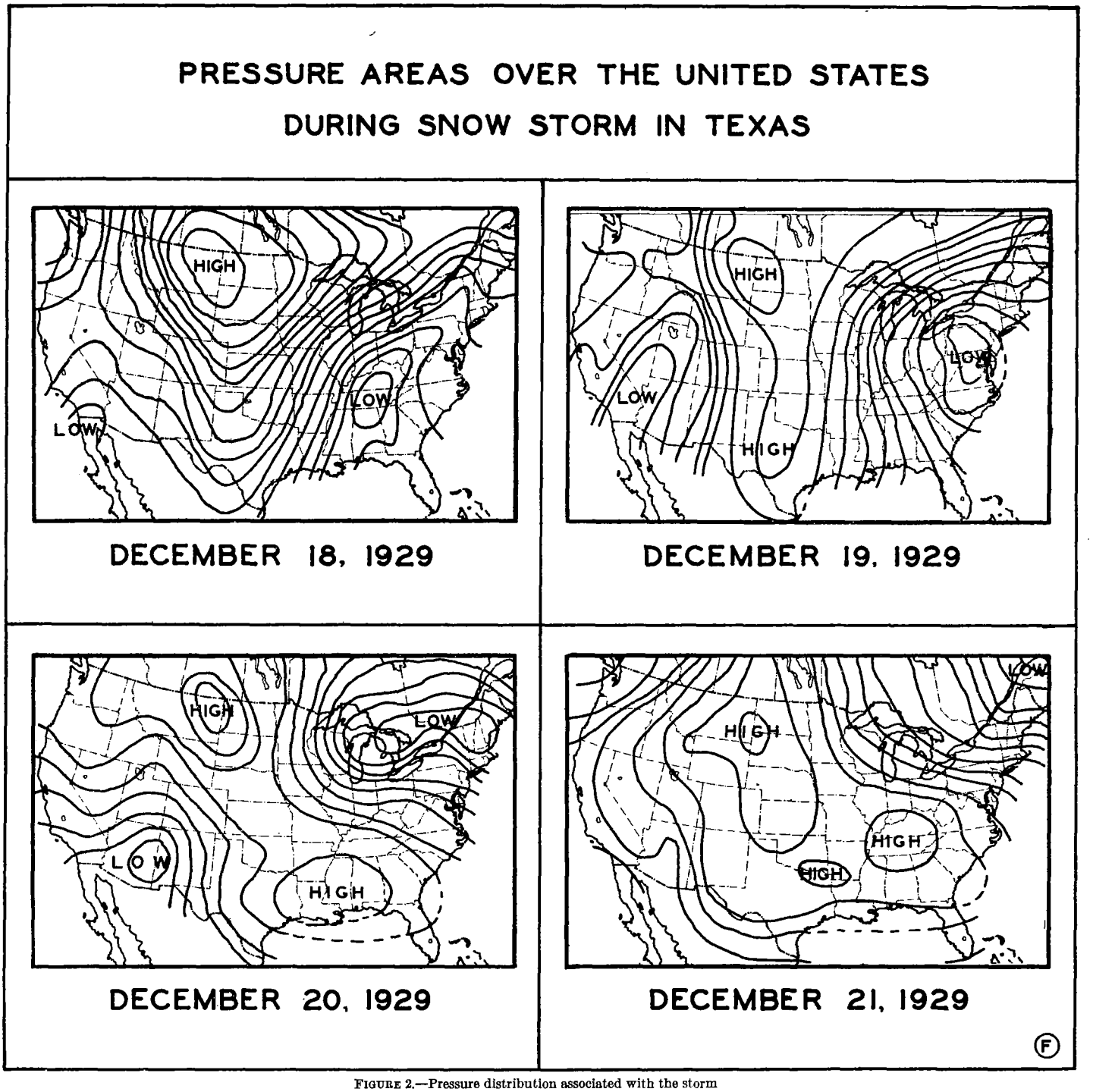

FIGURE 2.—Pressure distribution associated with the storm

around Childress. Most of this region had less than 2 inches of snow. On the second day (fig. 4) the snowstorm divided, a small part of it going to the southwest into the trans-Pecos country, giving a heavy snowfall in El Paso of over 5 inches. Most of the storm moved toward the southeast, giving a snowfall of more than 5 inches along the eastern front of the Balconese escarpment. The third day of the storm, December 21, gave the maximum snowfall for a 24-hour period. (Fig. 4.) Most of this snow fell along a line extending from Mason in the Edwards Plateau country, to Trinidad in East Texas, with the heavy spots around Mason and Hillsboro. On that day light snows fell as far south as the Gulf coast, bringing more than 2 inches to Houston and Beaumont. On the following day the snowstorm moved to the northeast. (Fig. 4.) East Texas received a heavy fall, with the maximum at Jefferson in northeast Texas, of nearly 20 inches.

TOTAL SNOWFALL

The composite map (fig. 5) of total snowfall for the four days of the snowstorm shows several pronounced features: (1) A widespread distribution of snow over most of the State; (2) a very heavy concentration along a line running from southwest to northeast through the center of the State; (3) steep gradients between near-by places, such as 26 inches in Hillsboro in contrast to 0.1 inch at Dallas, 70 miles northeast of Hillsboro; and (4) a

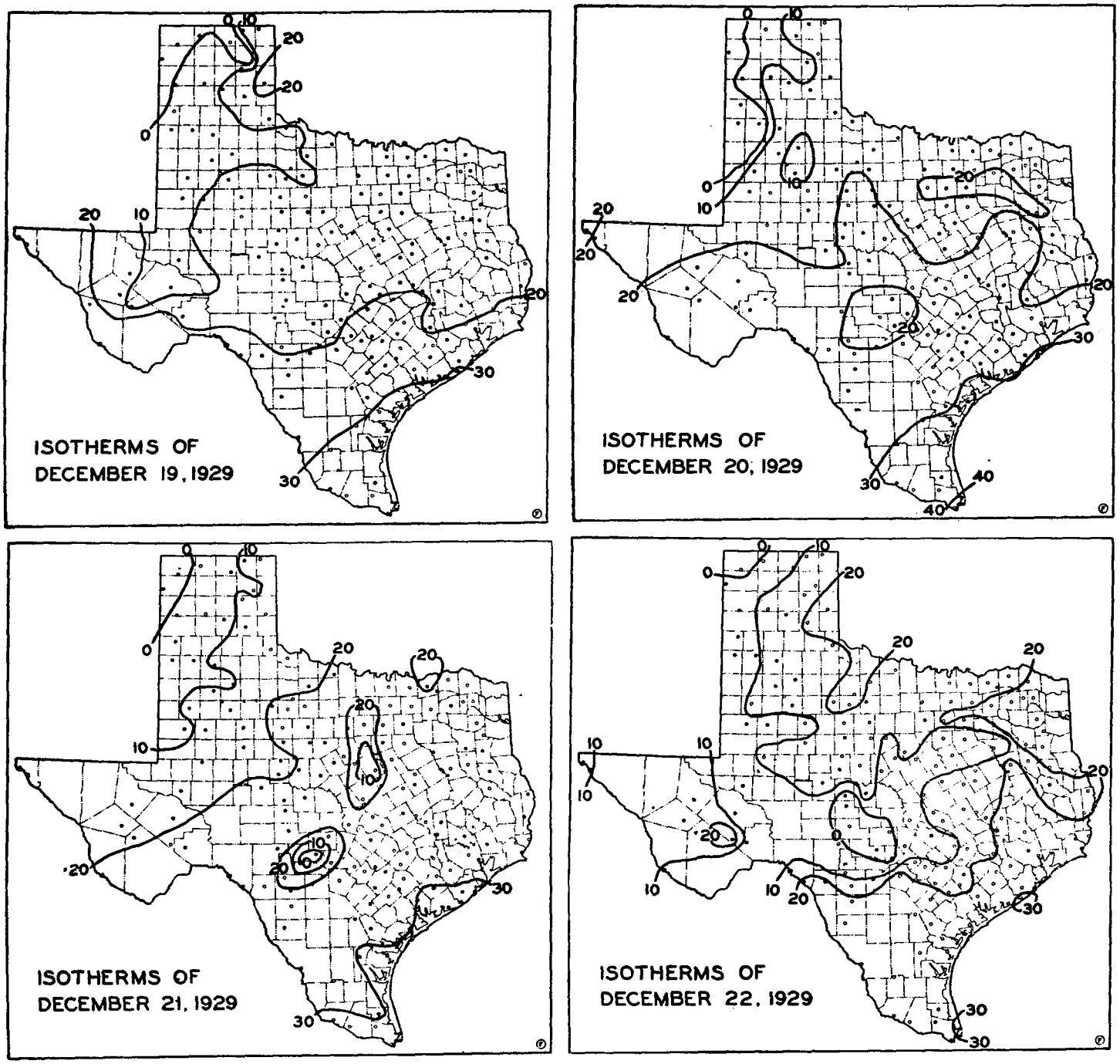

FIGURE 3.—Isotherms (F.) on the four days, December 19–22, 1929

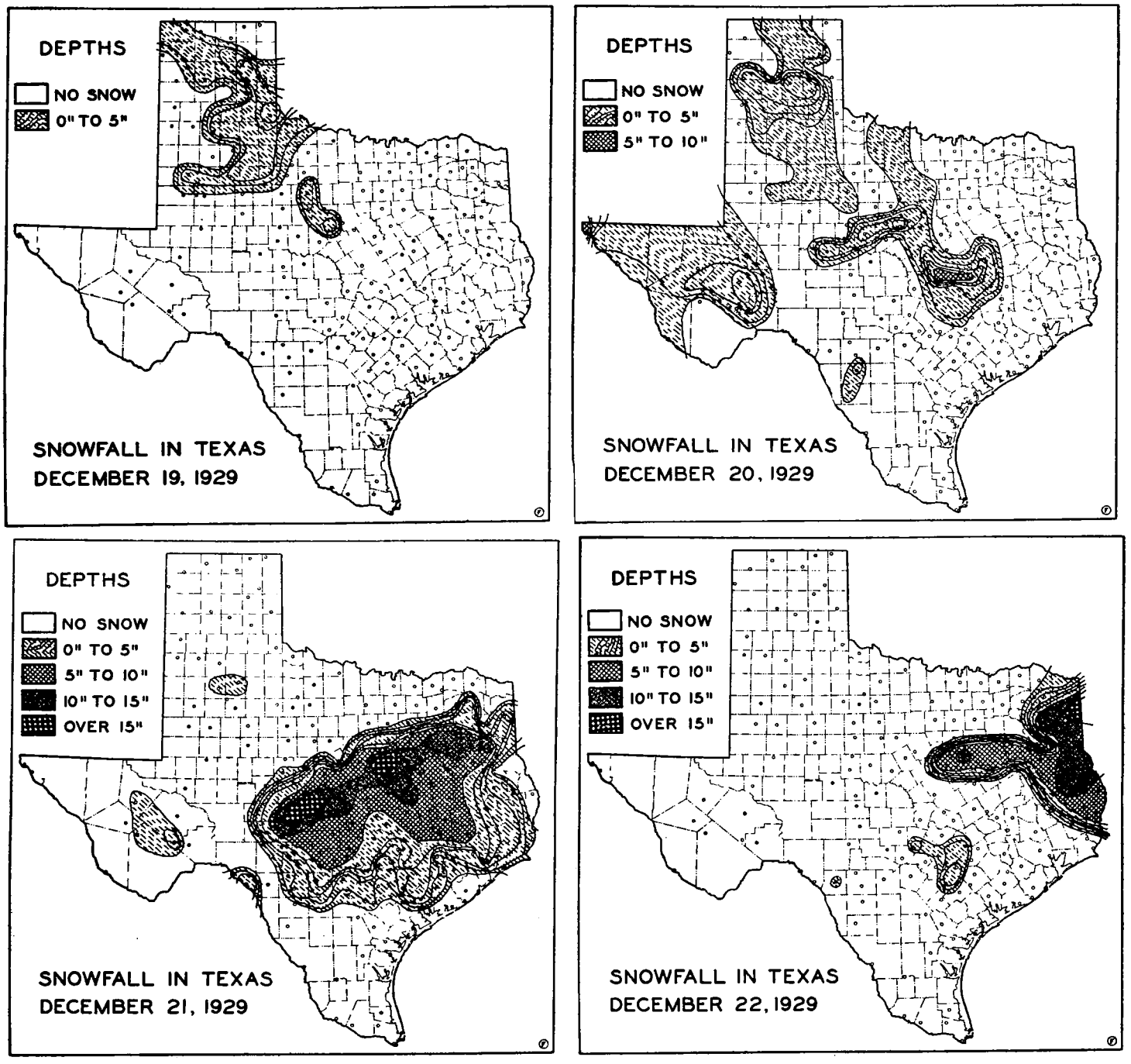

FIGURE 4.—Depth of snowfall on each of the four days, December 19–22, 1929

lack of snow in north Texas, where it is normally heavier than in other parts of the State.

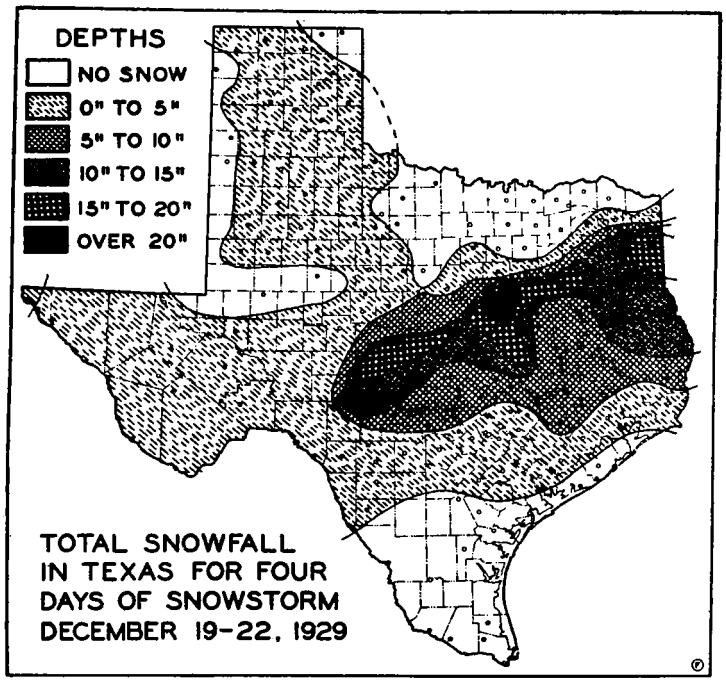

FIGURE 5.—Depth of snowfall on the four days, December 19–22, 1929

TABLE 1.—*Temperature and precipitation data during period of snowstorm, December 19–22, 1929*

(Selected stations)

SECTION A.—NORTHWESTERN TEXAS

Station	Minimum temperature (°F.)				Snowfall in inches			
	19	20	21	22	19	20	21	22
Amarillo	6	15	10	12	1.6	0.0	0.0	0.0
Clarendon	18	11	21	28	0.0	4.0	0.0	0.0
Dalhart	−1	0	−1	−1	1.5	0.0	0.0	0.0
Romero	−2	−4	−2	4	0.0	0.0	0.0	0.0
Wichita Falls	12	22	23	18	0.0	.1	0.0	0.0

TABLE 1.—*Temperature and precipitation data during period of snowstorm, December 19–22, 1929*—Continued

SECTION B.—NORTHEASTERN TEXAS

Dallas	14	24	28	19	0.0	0.0	0.1	0.0
Fort Worth	15	23	28	20	0.0	T.	T.	0.0
Gainesville	12	18	27	21	0.0	0.0	0.0	0.0
Paris	11	11	21	19	0.0	0.0	0.0	0.0
Sherman	10	12	21	18	0.0	0.0	0.0	0.0

SECTION C.—WESTERN TEXAS

Abilene	11	21	25	17	0.0	0.1	0.0	0.0
El Paso	21	23	17	15	0.0	5.2	0.0	0.0
Junction	17	20	26	0	0.0	0.0	14.0	0.0
Menard					0.0	18.0	0.0	0.0
Presidio	24	22	27	10	0.0	0.5	0.0	0.0

SECTION D.—CENTRAL TEXAS

Clifton	8	15	8	0	0.0	T.	16.0	8.0
Conroe	19	19	22	22	0.0	0.0	7.5	0.0
Groesbeck	16	25	25	13	0.0	2.4	5.6	0.0
Hillsboro	15	15	25	4	0.0	0.0	16.0	10.0
Palestine	14	23	24	24	0.0	T.	9.0	0.5
Taylor	19	24	25	13	0.0	1.5	4.1	0.0

SECTION E.—EASTERN TEXAS

Flint	16	21	24	26	0.0	0.0	12.0	0.0
Longview	15	16	24	22	0.0	0.0	2.0	12.0
Nacogdoches	15	17	23	20	0.0	0.0	0.0	12.0
Wiergate	12	16	24	5	0.0	0.0	5.0	7.0

SECTION F.—SOUTHWESTERN TEXAS

Austin	21	26	23	17	0.0	1.0	4.5	0.0
Del Rio	26	28	27	22	0.0	0.0	2.2	0.0
Kerrville	16	19	−4	0	0.0	0.0	6.0	0.0
Rio Grande	34	36	31	26	0.0	0.0	T.	0.0
San Antonio	23	25	24	21	0.0	1.0	1.9	0.0

SECTION G.—TEXAS COAST

Beaumont	24	25	29	27	0.0	0.0	2.0	0.0
Brownsville	32	39	32	29	0.0	0.0	T.	0.0
Corpus Christi	30	36	31	28	0.0	0.0	T.	0.0
Galveston	23	30	30	29	0.0	0.0	T.	T.
Houston	20	24	27	24	0.0	0.0	2.5	0.0
Mission	31	33	31	28	0.0	0.0	0.0	0.0
Point Isabel	35	41	34	32	0.0	0.0	0.0	0.0
Port Arthur	23	26	28	27	0.0	T.	1.2	T.